



KAISER PERMANENTE®

Kaiser Permanente's “Convergent Medical Terminology”

**NCVHS Testimony
May 22, 2003**

**Bob Dolin, MD
Kaiser Permanente**

About me...

- Kaiser Permanente Department of Internal Medicine, National Clinical Information Systems
- HL7 Board of Directors; Co-Chair Structured Document Committee
- SNOMED Editorial Board

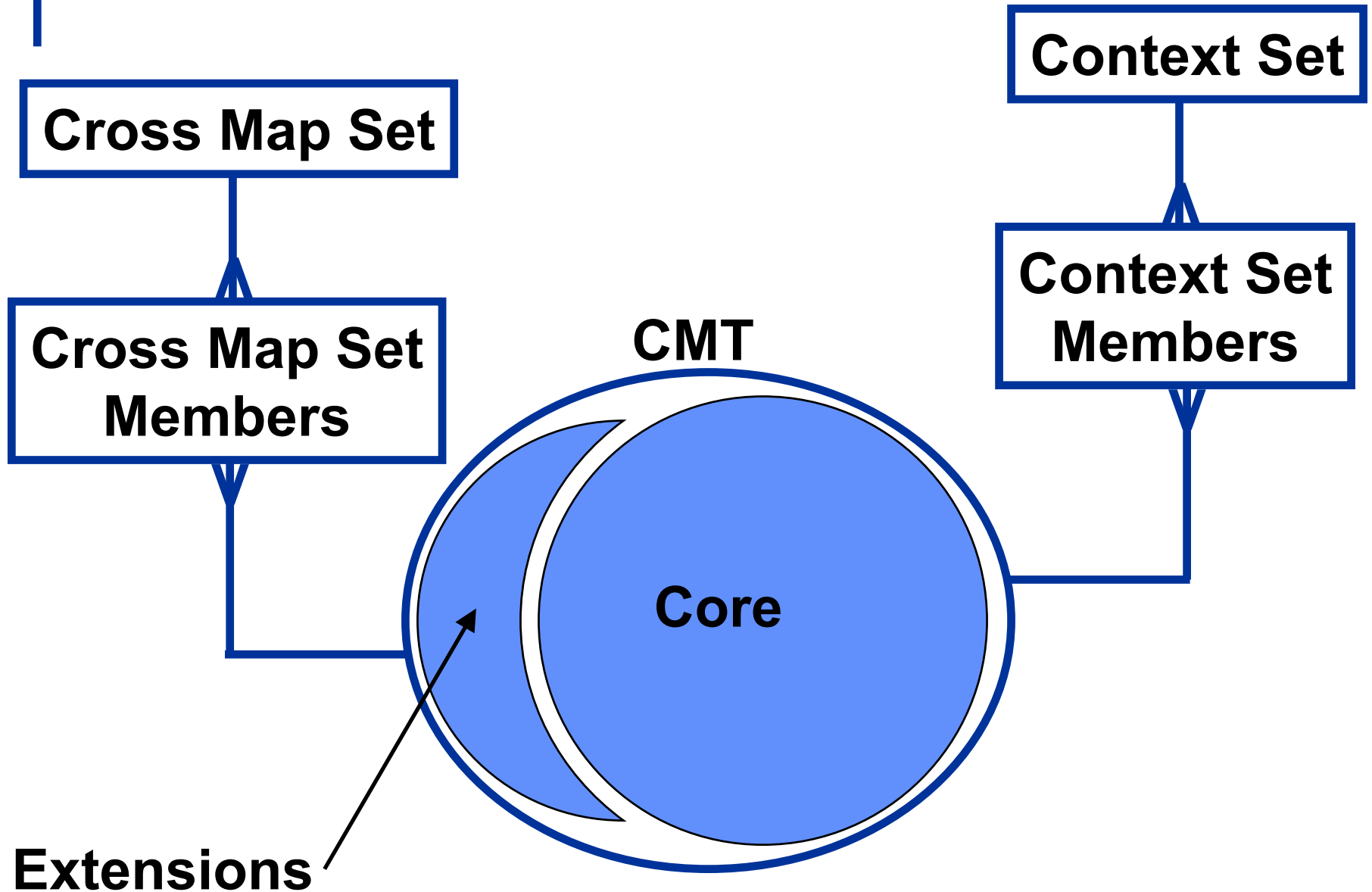


Kaiser Permanente's “Convergent Medical Terminology”

CMT is Kaiser Permanente's central terminology resource

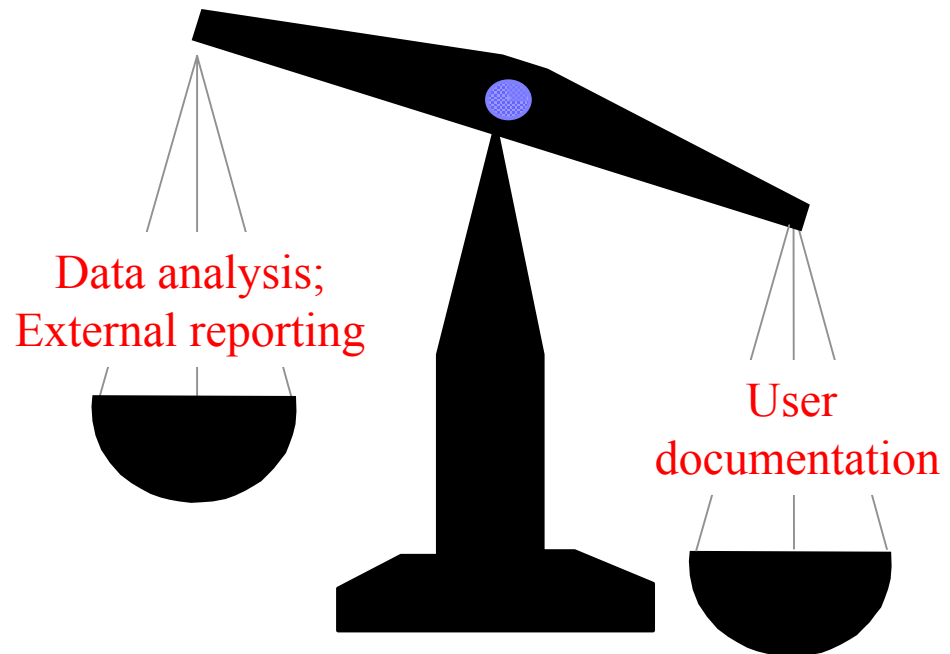
- Originally developed to serve the needs of our evolving national electronic health record.
- Evolving to become a core KP asset, serving as the common terminology across all applications.
- Serves as the definitive source of concept definitions for all codes used within the organization.
- Provides a consistent access to all terminologies used by the organization.

CMT Overview



CMT balances many objectives

- Support user documentation
- Support data analysis
- Support external reporting



CMT is built upon industry standard terminologies

- SNOMED CT + Laboratory LOINC + First Data Bank drug terminology form the core of CMT.
- Core terminologies are integrated into a single knowledge base .

CMT is Kaiser Permanente's “lingua franca” of interoperability

- CMT concepts are interfaced to regional lab, radiology, immunization, EKG codes – enabling data comparison across regions and across applications.
- CMT concepts are mapped to HL7 vocabulary concepts – enabling exchange of standard HL7 messages.
- Disorders / Findings – are mapped to ICD9
- Procedures – are mapped to CPT4
- Devices – are mapped to HCPCS

CMT is a “knowledge base”

- Concepts have logic-based definitions, imported from the source terminologies.
- A “classifier” organizes the CMT concepts into a poly-hierarchy, based on their definitions.
- The act of “classifying” helps identify synonymous concepts.
- Logic-based definitions allow a computer to compare various representations and determine whether or not they mean the same thing¹. For example, when querying for all patients that have had a “pituitary operation”, CMT enables you to retrieve those records where the provider entered codes for:
 - “hypophysectomy”
 - “brain excision” + “pituitary gland”.
 - “partial excision of pituitary gland by transfrontal approach”
 - “brain incision” + “pituitary posterior lobe”
- ¹ Dolin RH, Spackman KA, Markwell. Selective Retrieval of Pre- and Post-coordinated SNOMED Concepts. Fall AMIA 2002.



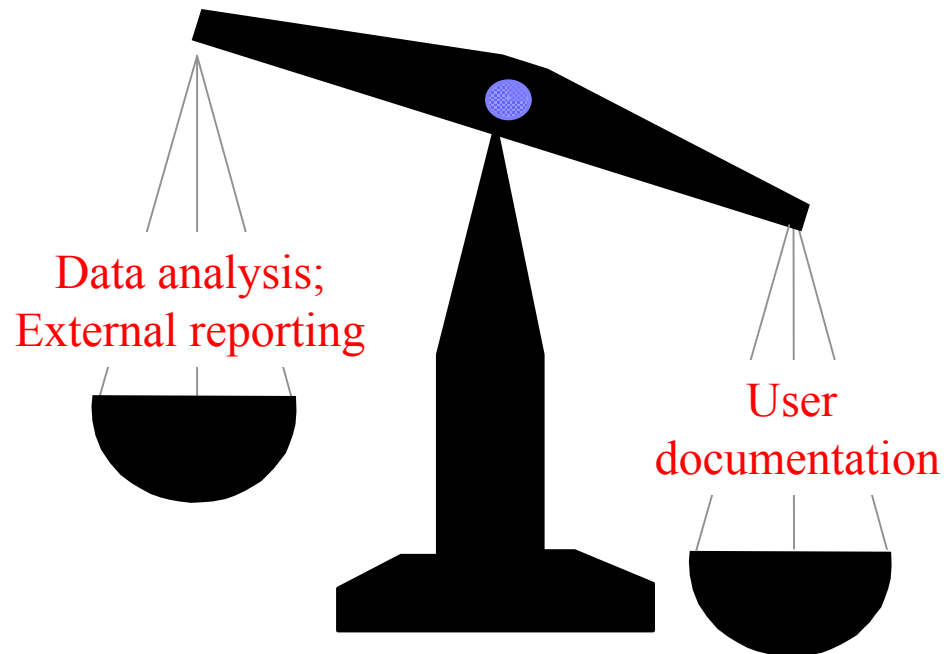
Lessons Learned

Cross mapping is hard

- Mapping represents perhaps the biggest cost of enterprise-wide terminology deployment. There is a large initial investment as interfaces are built.
 - Mappings are use case dependent. The type of mapping, and the scrutiny by which the mappings are QA'd, vary by use.
 - Some mappings – such as those needed to support order entry and results reporting - have major clinical implications if incorrect, and require manual review by at least two domain experts.
-
- Dolin RH, Barsoum R, Esteva D, Lee MH, Peacock J, Shalaby J, Schwarz K. A Review of Mapping Scenarios Encountered During the Operational Deployment of an Enterprise Terminology. Fall AMIA 2003 (submitted).

Establish usability as an organizational priority

- We define a set of objectives and guiding principles that clearly articulate the need to support usability, while balancing it against the needs of data analysis and external reporting.



Differentiate “interface” from “reference” terminology

- A level of indirection, where the application interacts with context sets rather than directly with CMT, allows us to:
 - Identify the specific subsets of CMT that are relevant in a particular context.
 - Alter concept display names and synonyms depending on the context.
 - Insulate users from changes (additions, inactivations, etc) to the source reference terminologies.

Make it easy for users to find the concepts they need

- Develop user-friendly names
 - Develop style guidelines for concept display names and abbreviations.
 - Work with user-groups on naming conventions and search strategies.
- Maximize search precision and recall
 - Create search keywords.
 - Use context sets to limit the number of concepts that appear in a particular context.
 - Tailor the search strategy to the application serving up the terminology.

Demonstrate immediate value of coded data to the user

- Where we've successfully triggered decision support off coded data, we find the users more willing to use it. We capture coded data for allergies, diagnoses, and orders almost uniformly, and we commonly capture the reason for visit. These codes are used to trigger drug-allergy alerts, data entry templates, and other forms of decision support.

Action items for our core terminologies

■ SNOMED CT

- Further development of SNOMED CT qualifiers as a way of constraining allowable post-coordination.
- Standardizing various SNOMED CT context sets – e.g. for allergies, for HL7 fields, etc.
- Refinement of the SNOMED / HL7 Reference Information Model overlap – develop guidelines and/or a formal mechanism for identifying redundancy; develop necessary cross-maps to HL7 code sets.
- Foster a broader understanding and demonstrations of the power of the description-logic underpinnings of SNOMED CT.
- Further enhancement of term request process.

Action items for our core terminologies (cont)

■ Laboratory LOINC

- Additional scrutiny over the values used to populate the component axes (such as the set of measured components) – unambiguous definitions and hierarchical relationships.
- A cross-map between component values and SNOMED CT would facilitate a complete integration of these terminologies (as described in Dolin RH, Huff SM, Rocha RA, Spackman KA, Campbell KE. Evaluation of a “Lexically Assign, Logically Refine” Strategy for Semi-automated Integration of Overlapping Terminologies. JAMIA 1998;5:203-213).

Action items for our core terminologies (cont)

■ First Data Bank

- Isn't a standard, therefore doesn't work as a "lingua franca" for drug-related information across applications (medications, allergies, indications, etc).
- Would prefer to see a national standard drug terminology (e.g. RxNorm), that goes down to the clinically relevant level of granularity, and that is fully integrated with SNOMED CT. Vendors would ideally adopt or map to this national standard.
- Kaiser Permanente supports RxNorm, and is in the process of evaluating it.